

## PATENT ABSTRACTS OF JAPAN

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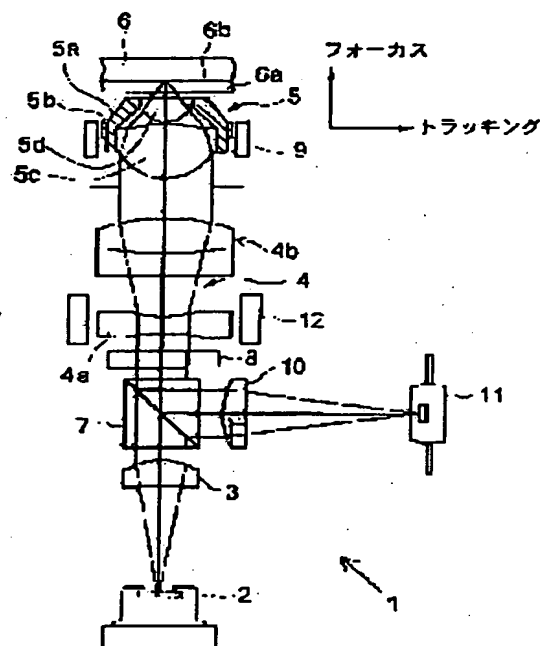
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**(54) ABERRATION CORRECTING ELEMENT, OPTICAL PICKUP DEVICE AND RECORDING AND REPRODUCING DEVICE**

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an aberration correcting element suppressing light quantity loss by the transfer defects of the adjacent zonal level differences of a diffraction lens while sufficiently correcting the color aberration of an objective lens and to provide an optical pickup device and a recording and reproducing device for which a manufacture cost is suppressed.

**SOLUTION:** The aberration correcting element has 2-group 3-lens constitution composed of the diffraction lens 4a arranged between a light source 2 generating the light of a wavelength equal to or less than 500 nm and the objective lens 5 whose image side numerical aperture is equal to or more than 0.8 and provided with a diffraction surface where a diffraction structure composed of a plurality of concentric zonal level differences is formed on an optical surface, and a doublet lens 4b for which the positive lens of a relatively large Abbe number and the negative lens of a relatively small Abbe number are joined, and satisfies  $P\lambda_2 > P\lambda_0 > P\lambda_1$  ( $P\lambda_0$ : the paraxial power of the aberration correcting element in the light of a prescribed wavelength,  $P\lambda_1$ : the paraxial power of the aberration correcting element in the wavelength shorter than the light of the prescribed wavelength by 10 nm,  $P\lambda_2$ : the paraxial power of the aberration correcting element in the wavelength longer by 10 nm than the light of the prescribed wavelength).

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]

[Claim 1] The light source which generates light with a wavelength of 500nm or less, and the objective lens with which image side numerical aperture for making the information recording surface of an optical information record medium condense the flux of light by which outgoing radiation was carried out from said light source was made or more into 0.8, It is the aberration amendment component arranged between \*\*. Said aberration amendment component The diffraction lens which has the diffraction side where the diffraction structure which consists of two or more concentric zona-orbicularis level differences was formed on at least one optical surface, the doublet lens to which the negative lens with the small Abbe number was joined relatively [ positive lens / with the large Abbe number ] relatively -- since -- the aberration amendment component characterized by having the becoming two three groups configuration and filling a degree type.

Plambda2>Plambda0>Plambda1, however Plambda0: Paraxial power of said aberration amendment component in the light of predetermined wavelength (mm-1)

Plambda1: Paraxial power of said aberration amendment component in wavelength shorter 10nm than the light of predetermined wavelength (mm-1)

Plambda2: Paraxial power of said aberration amendment component [ in / from the light of predetermined wavelength / 10nm long wave length ] (mm-1)

[Claim 2] The aberration amendment component according to claim 1 characterized by filling a degree type.

lambdaMIN> 0.02mm (2)

However, lambdaMIN: The minimum value of spacing of a direction vertical to the optical axis of the \*\*\*\*\* zona-orbicularis level difference of said diffraction structure of said diffraction lens [claim 3] The aberration amendment component according to claim 2 characterized by filling a degree type.

lambdaMIN> 0.03mm (3)

[Claim 4] An aberration amendment component given in claim 1 characterized by forming the diffraction structure which consists of two or more concentric zona-orbicularis level differences on both sides of said diffraction lens thru/or any 1 term of 3.

[Claim 5] An aberration amendment component given in claim 1 characterized by filling a degree type when m is made into two or more integers thru/or any 1 term of 4.

Delta=m-lambda/(Nlambda-1)

However, delta: The amount of level differences of the direction of an optical axis of said zona-orbicularis level difference (mm)

lambda: Wavelength of the light which said light source generates (mm)

Nlambda: The refractive index of said diffraction lens in said wavelength [claim 6] An aberration amendment component given in claim 1 characterized by filling a degree type thru/or any 1 term of 5.

nudP-nudN> 15 (5)

| NlambdaP-NlambdaN\*\* -- <0.1 (6)

however, nudP: -- Abbe number nudN: of d line of said positive lens -- Abbe number NlambdaP: of d line of said negative lens -- refractive-index NlambdaN: of said positive lens in the wavelength of the light which said light source generates -- the refractive index [claim 7] of said negative lens in the wavelength of the light which said light source generates. The light source which generates light with a wavelength of 500nm or less, and the objective lens with which image side numerical aperture for making the information recording surface of an optical information record medium condense the flux of light by which outgoing radiation was carried out from said light source was made or more into 0.8, It is optical pickup equipment equipped with the aberration amendment component arranged between said light sources and said objective lenses. Said optical pickup equipment As said aberration amendment component, it has the aberration amendment component of a publication in claim 1 thru/or any 1 term of 6. It is said diffraction lens's being a plastic lens, having an actuator for carrying out adjustable setting of the location of said plastic lens in the direction of an optical axis, and carrying out adjustable setting of the location of said plastic lens in the direction of an optical axis. Optical pickup equipment characterized by amending change of the spherical aberration of the spot condensed by said information recording surface.

[Claim 8] Record of the voice and/or the image which are characterized by carrying optical pickup equipment according to claim 7, voice, and/or the regenerative apparatus of an image.

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